

Title:

Particle acceleration and magnetic dissipation processes in the plasma sheets of relativistic pair plasmas

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Abstract:

We investigate the linear and nonlinear evolution of a relativistic current sheet of pair plasmas by particle-in-cell (PIC) simulations. First we examine two 2D problems: 1) relativistic magnetic reconnection, which features dc particle acceleration around the X-type diffusion region, and 2) the relativistic drift kink instability (RDKI) in the cross-field plane, which features fast magnetic dissipation. Based on these results, we discuss the current sheet evolution in 3D. We also consider a current-aligned magnetic field (the "guide field") and we find that the guide field plays an important role in the late-time development of the current sheet.